Chapter 2
Review of Literature

Speech recognition technology is one of the most popular and potential technologies. Generally speech recognition has changed the computer into an "intelligent" device. Speech is the most natural communication medium. People are very good at speaker and speech recognition. The human brain uses neurons and synapses, modified with experience and provides a distributed form of associative memory. Motivated by this, speaker and speech recognition systems have been developed. Speaker recognition is the technology of letting a machine distinguishes different speakers from each other. Depending on the different speakers different actions are implemented. Speech recognition is the technology of letting a machine understand human speech and, according to the meaning of the speech, implement the intention of the human.

Table 2 Review of Papers

Author	Year	Topic Name
Written under the direction of Dr.Caisimir Kulikowski and Dr.James.	October 1999	Robust speech recognition using neural networks and hidden markov models.
Xiaoguo Xue	May 9,2013	Joint speech and speaker recognition using Neural Networks.
Pankaj Rani, Sushil Kakkar, Shweta Rani	2015	Speech Recognition using Neural Network
Roddy Posada and Eric Pak		Arduino, Xbee and Arduino, Xbee and Xbee and Matlab GUI Research Matlab GUI Research (HOW TO)

2.1. Robust speech recognition using neural networks and Hidden Markov Models:

Automatic speech recognition by computers is a process where speech signals are automatically converted into the corresponding sequence of words in text. With recent advances, Speech recognizers based upon hidden Markov models (HMM's) have achieved a high level of performance in controlled environments. In real life applications, however, speech recognizers are used in adverse environments. The recognition performance is typically degraded if the training and the testing environments are not the same. In this chapter, automatic speech recognition methods that are robust to the environmental mismatches are explored.

2.2. Joint speech and speaker recognition using Neural Networks

Speech recognition using Neural Networks are a hotspot of international academic circles. This thesis uses speech recognition as the research background, to research the whole recognition process system. To sum up, the main work and result of this thesis are:

- Research the theory of speech recognition, including its history, developing trend, signal processing, feature extraction and compression. MFCCs were used as the features; different clusters were tested to get the best cluster number which was chosen for the final use. This gives us a detailed information, not only a theoretical one on how to do the whole process, but also gives the specific functions for practical execution.
- Research about neural networks, from its developing history, elements and theory of recognition. The Back propagation neural network was used in the recognition system as the recognition method, different numbers of hidden layer nodes were tested and the best hidden layer was chosen for the final use. The result shows that BP neural network works well when being used in speech recognition system.
- All the processes and procedures were implemented in Matlab. From the experiment level to testing the pre-emphasis, framing, windowing, feature extraction, compression and recognition, and then the performance analysis and result description. The presentation of errors with all the test samples and test/validation data only gave a more accurate and objective result.

2.3. Speech Recognition using Neural Network

Speech could be a useful interface to interact with machines. To improve this type of communication, researches have been for a long time. From the evolution of computational power, it has been possible to have system capable of real time conversions. But despite good progression made in this field, the speech recognition is still facing a lot of problems. These problems are due to the variations occurred in speaker including the variations because of age, sex, speed of speech signal, emotional condition of the speaker can cause the difference in the pronunciation of different persons. Surroundings can add noise to the signal. Sometimes speaker causes the addition of noise itself. In speech recognition process, an acoustic signal captured by microphone or telephone is converted to a set of characters. A view about automatic speech recognition (ASR) is given by describing the integral part of future human computer interface.

Hence for the interaction with machines human could use speech as a useful interface. Human always want to achieve natural, possessive and simultaneous computing.

Speech Recognition System of disorder people with audio speech recognition system. Comparison between different visual features methods for selection is done and English isolated words are recognized. The recognition of simple alphabet may be taken as a simple task for human beings. But due to the occurrence of some problems like high acoustic similarities among certain group of letters, speech recognition may be a challenging task. The use of conventional neural network of Multi-Layer Perceptron is going to increase day by day. Work is well done as an effective classifier for vowel sounds with stationary spectra by those networks. Feed forward multi-layer neural network are not able to deal with time varying information like time-varying spectra of speech sounds. This problem can be copied by incorporated feedback structure in the network.

2.4. Arduino, Xbee and Arduino, Xbee and Xbee and Matlab GUI Research Matlab

The main task to be accomplished in this lab is to communicate or replace the USB connection (wire) between Matlab (PC) and the Rover (Arduino), this would be achieved by using wireless adapters, and also by modifying the code for MATLAB and Arduino. As mentioned in the original lab this it would be fun to “drive around the rover” using your PC without having the length limitation of the USB cable.